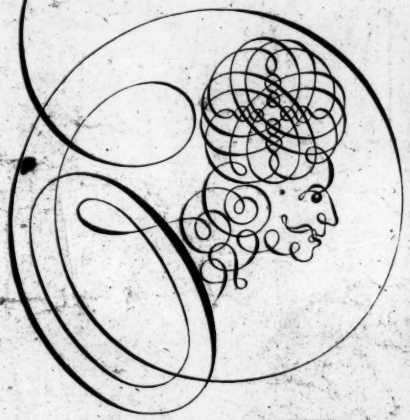
Cocker (E.) The Rules of Arithmetic, etc.

K

1268. a.

The Numeration Table.



Millions.	Millions.	Millions.	Thousands.	Thousands.	Thousands.	Hundreds.	Tens.	Units.
9	8	7	6	5	4	3	2	1
1	1	1,	1	1	1,	1	1	1,
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9
9	8	7	6	5	4	3	2	1
	9	8	7	6	5	4	3	2
		9	8	7	6	5	4	3
			9	8	7	6	5	4
				9	8	7	6	5
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						9	8	7
							9	8
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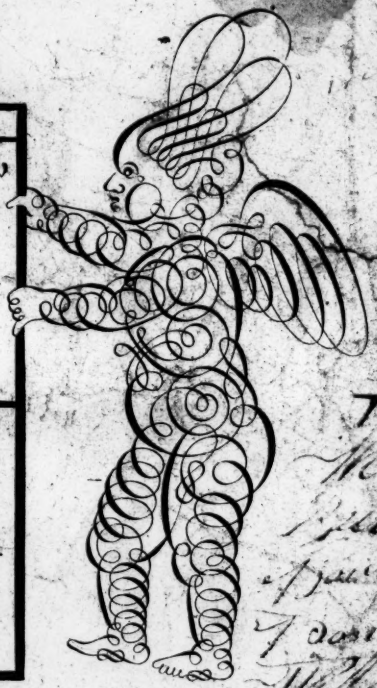

In Numeration who doe well proceed
Numbers increase from right to left must heed:
So shall they Numbers truly write & read
Cocker

7234

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a, b, d, e, g, o, p, q, s, v;
Have like Circumferente when written true.
l, b, s, f, t, k and h, these seaven;
Have for their stems Rules from eath other given.
i, t, n, m, r, w, x, y, zed,
Here six like minums, three like tails have bred.

A, C, E, O, G, Q, and T;
To make eath other helpefull bee.
B, N, M, R, with V and W;
Beginne alike, and will not trouble you.
L, K, H, ff, J, P, z Z we make
Those foure z three in their first parts partake.
The D z S, y X z Y Have somthing of conformity.

Cocker.

Honorificabilitudinitatis

John Bignell 1776

John Bignell 1776

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ccker.

A a b b c c d d e e f f g h i j k l m m n n o o p p q q r r s s t u v w x y z

Addition

is an Arithmeticall Gathering of two, or more Numbers into one Total Summe. In wch Rule we must observe to begin at the right hand & write ye particular Summes of the severall rowes under every one in its own place.

Cocker.

Elizabeth Bignell

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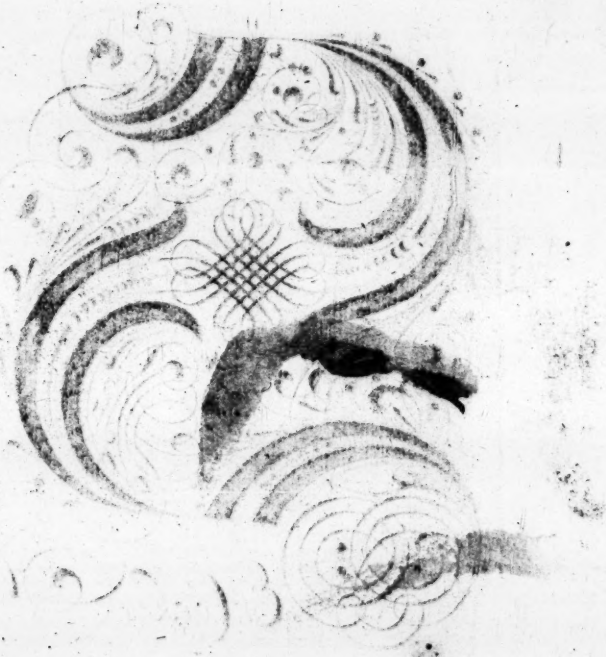
Bignell is my Name

Subtraction teacheth to abate, drawe; or take a lesser Number from a greater, or an equall from an equall whereby we finde ye rest, remainder, exces or difference.

E: Cocker. A a b c d e f g h i k l m n o p q r s t v u w x y z

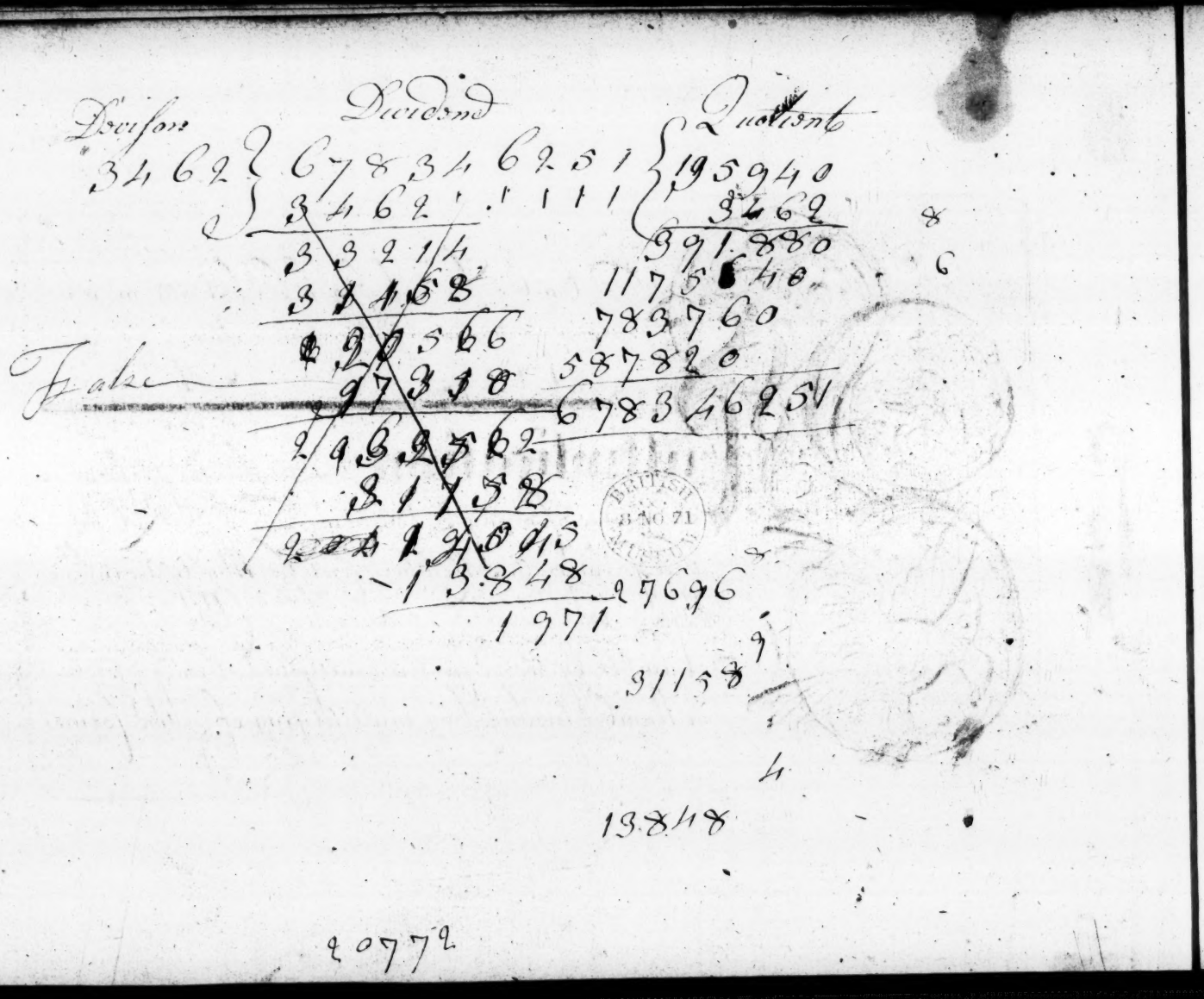
E Cocker A a b c d e f g h Numb



A a b c d d e f f g h h i k l all m n n
o o o p p q r r s s t v v u w x y z o and

Multiplication compendiously performes the Worke of many Additions. To wch Rule belong three principall Members; first the Multiplicand, or Number to be multiplied: Secondly ye Multiplier, or Number by wch the first is multiplied; thirdly ye product or Number produced by multiplying of ye two former.

Cocker.


Divisor
Dividend
Quotient
Falsa

a b c d e f g h i k l m n o p q r s t v u w x y z &

Division hath three Members or all, and a fourth accidentall. First the Dividend, or Number to be divided: secondly y Divisor by w. the first is divided: thirdly the quotient, or Number produced. fourthly the remainder.

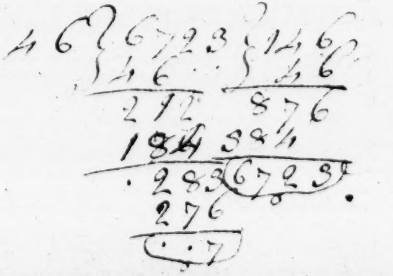
A B C D E F G H I K L M N
O P Q R S T V W X Y Z

The Golden Rule, or The Rule of Three,

Cocker. Is so called, becauss therein are three Numbers knowne, given to finde a fourth vnknowne, wch shall beare such proportion to ye third, as ye Second to the first, from whence also it is named

The Rule of Proportion;

Wherein we multiply ye Second Number by the third, & divide the Product by the first, and the quotient is the fourth Number:



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Barter is a Rule amongst Merchants wch
informes them in the Exchanging of one
Commoditie for another so to proportion
their Rates, as yt neither shall sustaine loss.
Aa b b c ↄ d e æ f g g h h i ij k k l m n o p p
q r z ſ s ß t tt ſt ſt v u w w x y y z z & &c.
Edward Cocker

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Roman Letters .i.o.f.s.v.x.z

A a a b b c c d d e e æ f ff g g h h i ÿ k k l ll

m mm n nn o oo p p q q r r ſ s ss t tt v u w w x y y z

Cocker.

A B C D E E F G H I K L M

M N O P Q R S T V W X Y Z

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What one weeke gaines in Farthings, will appeare
So many Pence, and Shillings in a yeare.

Compute the Pence, but of one dayes Expence;
So many Pounds, Angels, with Groats & pence,
Amount in a whole Yeares Circumference. s. d.

Cocker.

ABCDEFGHIKLMNOPQRSTVWXYZ

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a a a

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EDWARD COCKER.

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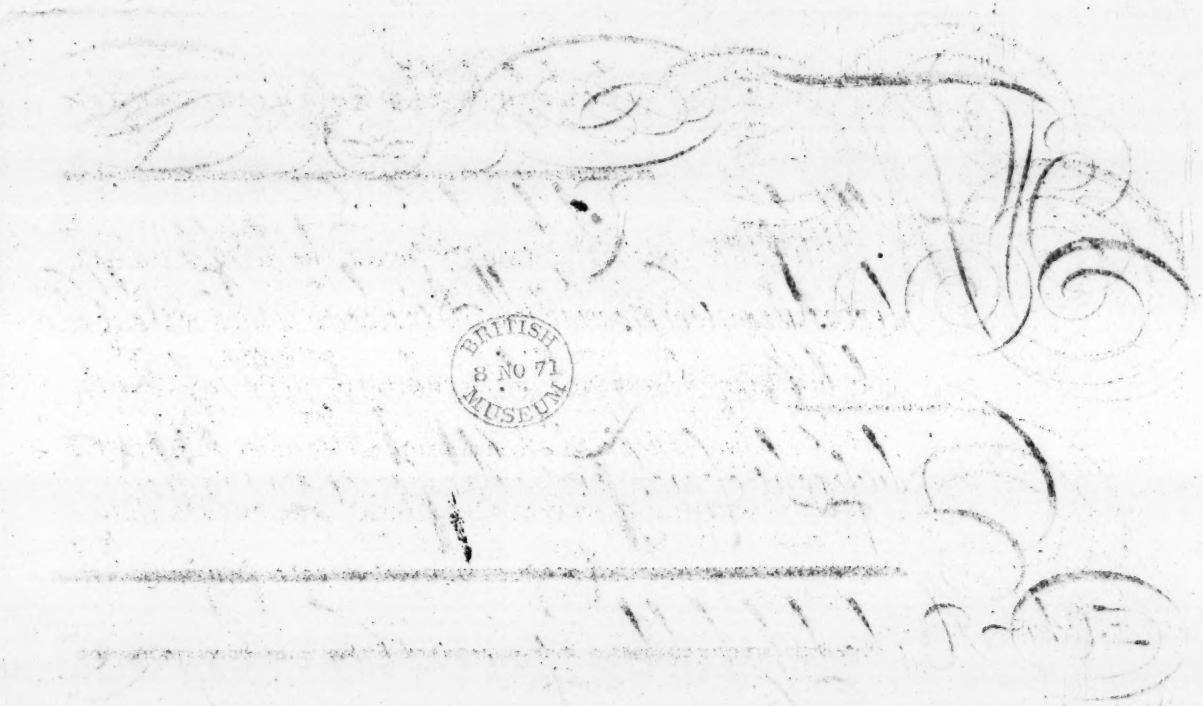
Fellowship is a Rule by which in Accompts amongst
divers men (their severall Stocks together with the
whole Gaine or Losse being propounded) the profit, or
dis-profit of each particular person may be discovered.

E. Cocker. A a b c d e f g h i k l m n o p q r s t u v w x y z &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a b c d e f g h i k l m n o p q r s t v u w x y z

Alligation consists of two Species, the first is named Alligation Mediall, which discovers ye meane Price of a mixture of severall particulars of differing Rates. The second is termed Alligation Alternate, wch discovers such quantities of divers Simples, of knowne Rates, as are fit to make a Composition, at a rate propounded.

Cocker.

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Cocker

Position, or the Rule of False, is alwayes performed by false, or Suppositiall Numbers, taken at pleasure after the proposition is made, and the Question propounded: for things are said to be found out by the Rule of false, when by false Termes Supposed we discover the true termes required.

A a b c d e f g h i y k l m n o p p q r r s s t t t v u w x y y z &c.

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[illegible]

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[illegible]

[illegible]

[illegible]

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Chancery Letters

A. A. a. a. G b. C. t. tt. D. d. E. e. e. ff. f. G. g. g. h. I. i. ij.
k. l. ll. ll. m. m. N n. nn. O. o. oo. P. p. pp. Q. q. q. R r. r.
or. S. s. s. ot. st. T. t. tt. V. v. u. v. W. x. y. z. z. p. p. qd. &c.

Cotkey.

A. a. B. C. D. d. dd. E. F. G. H. h. I. i. ij. K. L. M. M. m.
N. u. O. P. Q. R. r. S. s. s. T. V. n. v. W. w. w. x. y. y. z. &c.

Gaza frequens, lybitos duxit Carthago triumphos. k. w.

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Edjus Cockey

Carolus

Ecclesiae Dei gratia Magnae Ecclesiae Ffidei et Hibernie Rex fidei Defensor Archiepiscopis Episcopis Ducibus Comitibus Vicecomitibus etc

Actor homo, Coelum Spectator, grande Theatrum Mundus, Vita frequens Fabula, Scena dies. xy

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Riches and Honour are gained, and maintained by Writing & Arithmetick.

A a b c d e f f g h i k l m n o p q r r s t s t v u w v y z.

Cocker.

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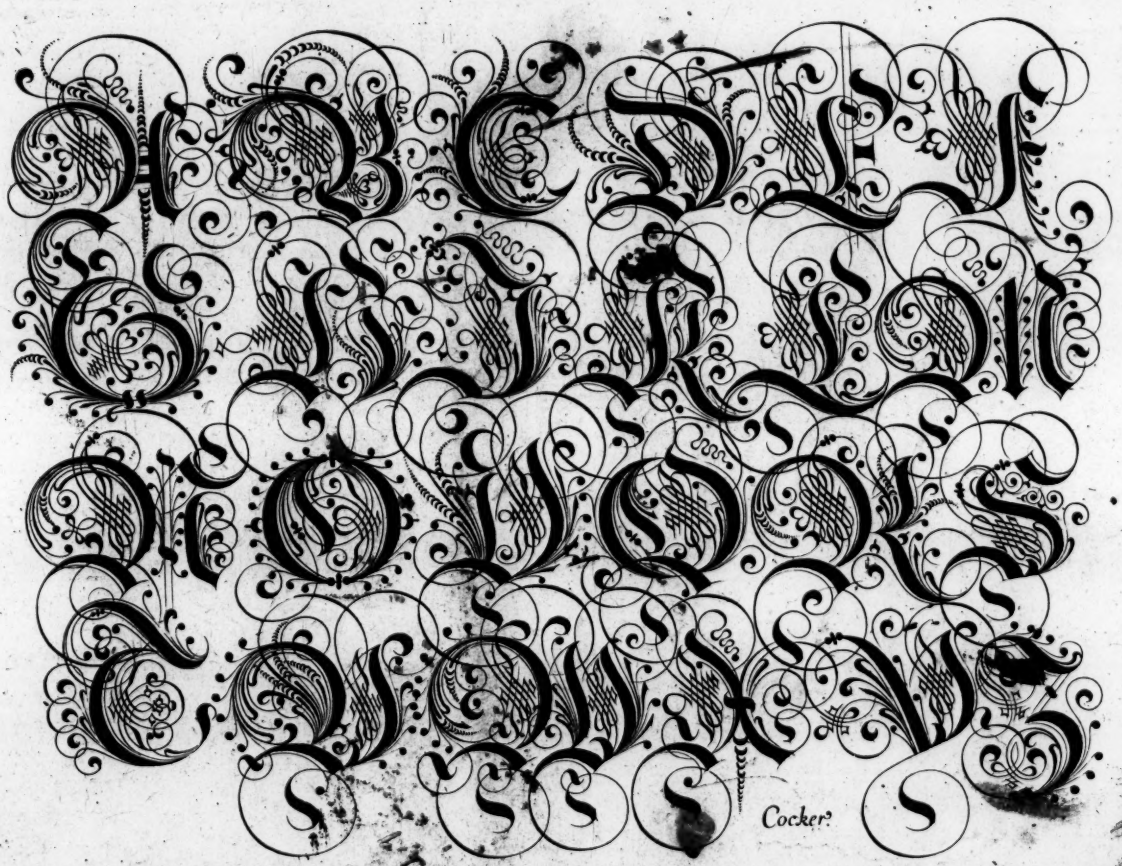
Cocker?

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How to make a Pen.

The Pen's the Axis, on which moves the Sphere
of this Rare Art, we therefore give you here
Such Rules, and Theorems as we think best
To make that Instrument which forms the rest.

IF you be furnished with choice, take the first, second or third Quill, in the Wing of a Goose, Raven or Crow, or any other in the Wings of those Fowls, that is Long, Round, Hard and Clear. With Clarks and Scriveners, who write much, the second Quill in a Goose wing is preferred before any other, as being most serviceable. The best Quills rise to a full round at their ends that is hard. All Quills are crusted over with a thine substance, which must be scraped clean off, with the Back-edge of your Pen-knife, or with that part of the fine Edge near the haft; which done, place the Quill in your Left-hand, after the same manner, as you hold it in your Right-hand when you write, that is, with its Feather-end from you: Being held betwixt the Thumb, the Fore-finger, and the Middle-finger, so as that it may rest on the End of your Middle-finger, and lye about a quarter of an Inch over, with its back towards your face; then set the Edge of your Knife even on the back thereof, about twice the breadth of the Quill from the end, and cut it sloping half thorough: Next, turn it in your hand, without applying your other hand to it, and meet the former cut with just such another, so cut off the end. After that, the Quill lying in your hand as at first, enter the Edge of your Knife even in that Arch or Half-round on the back of the Quill, and Slit it a very little way with an easie thrust: this is onely a preparation for a Slit that must go further up the Quill, which is made by putting the end of another Quill in, or the point of your Knife-haft, if it be fashioned for that purpose; which being suddenly twitched up, will make a Slit of what length you please. If the Quill be hard, the Slit must be long; if soft, short; which you may proportion according to your mind, by laying your Left-hand-thumb hard on the back, at such a distance from its end, as you would have the Slit to be in length, before you twitch it up. When that is done, if the Slit be too long, you may make it of a convenient size, by two sloping cuts, as before. The next thing you do is to fashion the Nib, to which purpose you must hold the Quill as formerly, with the back thereof, wherein the slit is, lying downward on your Middle-finger. Observe how far the Slit extends on that side, and enter your Knife above it, on the inside of the Quill, about twice the Slits length from the Quills-end, and cut such a peice off sloping, as may leave the Quill in fashion of a Scoop. That being done, turn the back thereof upward with the Slit to you, and apply the Edge of your Knife to the top of

the Arch of the Concavity or Scoop, and turning the Knife outward, cut a piece off, from the first entrance of the Knife down to the end of the Slit. Then turn the Quill from you, and cut such another piece off on the other side, still turning your Knife towards the back of the Quill. When you have done thus, to fashion the Nib, shave down the sides equally from the Slit, and bring it to a point; in doing which be sure never to turn the edge of your Knife toward the hollow of the Quill, for you must leave both the sides cut sloping from the back, so as that they may have an edge inward. To finish the Nib, you must hold the Quill between the Fore and Middle-fingers of your Left-hand, laying the inside of the Nibs-end on your Thumb-nail, then enter your Knife a little on its back, just at the end, and give a sloping cut, which may answer the sides; so the end of the Nib will be framed into right Angles, sharp as the edge of a Razor. After all this, you must cut such an Arch as before, in doing which, your Knife must descend toward the Nib, and cut a piece away half thorough the Quill, which will dispose the Pen into Angles above the Slit, called its Cheeks. Thus you may accommodate your self with a complete Pen, and that you may be as complete a Pen-man, Observe

The best way to hold the Pen.

TAke the Pen in your Right-hand, hold it betwixt your Fore-finger, Middle-finger, and Thumb, all your Fingers lying strait one by another, your Thumb rising in the joint. Your Hand being in this posture, set the ends of your Third and Little-finger on the Board or Desk, whereon you are to write; then put your other Fingers outward, or from you, so that your Middle-fingers end, may extend about half an inch from the end of your third Finger, that is, with the little one fixed on the Desk. Next, see that the Slit in the Nib, be placed strait before your Body. Let your Middle-finger lye on the side thereof, near the Arch or Hollow, and let your Fore-finger lye about half an inch above that, inclining to the back of the Pen, and place your Thumb somewhat more then that distance above your Fore-fingers end, towards the Pens inside; turn your Hand in the making of any Letter or Streak, a little outward, or from you, and let it move on your two Fingers ends, as is before directed; you will then see the Efficacy of these Rules. The next observable will be

The

The best posture in sitting to Write.

PLace your Body even before the light, or if you are denied that conveniency, chuse to let the light come on your Left-hand, whether by day or night. Sit upright, not bending your Back too much outward, and bear your Breast from the Desk or Board whereon you write, always two inches or more. Let the Book or Sheet of Paper, which you write in, lye strait before you, and hold up your Head above six Inches from it, draw in your Right-elbow almost close to your Side, and let your Hand and Arme lye both straight forth. Lay your Left-hand on your Book or Paper to keep it steady, and writhe neither your Body nor Head one way nor another. See that the Desk you write on stand not too low, least it cause you to bear too much stress on your Armes. Draw your Hand strait under the line as you write, and use not to snatch it up hastily, at the ending of a Letter or Words. These Rules punctually observe. For what may be further necessary, as to this I shall refer you to Mistris *Experience.*

How to apply, or manage the Pen.

FOr some time, at your first learning, the Paper must be ruled with double Lines, at such a distance as the Letters are in depth which you write by. It may be done by a small pair of Compasses, such as the distances in Maps are commonly taken with, or with an old Pen, whose Nib is cut off forked. The very best way is by a thin piece of lead, beaten smooth and even at the end with two points, at the same distance one from another as aforesaid, which will leave visible lines without making too great an impression. Some fancy at the beginning, the often tracing over the Letters with a dry Pen, but that is a dry conceit. Neither do I hold, (if the Learner doth it) that the making of Letters with Red-ink, or a Black-lead Pen, can be much furtherance; for when the Learner traces them over again with Black-ink, it will be but as if one should daub dirt upon dirt. But this I may with much reason urge to young Practitioners, that they would diligently and nicely observe the parts of which Letters consist, and what likeness, and correspondency Letters, and the several parts of Letters have one with another, for many Letters in the Alphabet have all one and the same beginning and ending, requiring the same motion of the Hand and Pen in their making. But in regard all

Learners

Learners are not ſo capacited, as to diſtinguiſh thoſe Letters, and their parts one from another, whoſe agreement renders them helpful to the making of each other, I ſhall here do it for them as artificially and plainly as may be. Thus, on thoſe two Fingers ends, as is afore directed, you muſt ſo move your Hand, as to command it any way, for the ready and clear carriage of all Strokes; whether they require to be put up from you, to be drawn ſideways, or towards you downward. And, becauſe you will find in any Hand you imitate, ſuch Letters as will exerciſe theſe ſeveral motions of your Hand and Pen. I ſhall firſt inform you

How all Secretary Letters are made.

IN writing the ſmall Alphabet you will find that the ß, t, ſ, y, ʒ, i, k, l, m, n, p, z, r, ſ, v u, w, x, y, and ʒ. Have their beginniug Strokes carried upwards, being made with the edge of the Pens Nib, by a very light carriage of the hand, which are from their ſmalneſs called hair-ſtrokes, and from them the Pen is drawn down, and turned to a flat Nib, according as the differing ſhapes of thoſe Letters require. In making the firſt parts of the a, d, e, o, q, ð, and ſ. The Pen is drawn downwards, beginning lightly with the edge, and being inclined to a flat by requiſite degrees. You may ſee theſe ſmall Letters, with their Capitals, more exactly delineated, in a Copy, at the beginning of this Book, wherein the ſimilary Letters are placed together, being interlined with verſes for information.

You have alſo about the middle of the Book, a Copy of the ſame nature, which may indifferently ſerve both for *Roman* and *Italian*; over which, in an Oval Compartment, are three or four Characters, which comprehend the whole Alphabet.

Now, though what hath been delivered in general, in order to theſe hands, may (to intelligent Perſons, with imitation of the foregoing Copies) be ſo efficacious, as to lead them to the writing of a good hand. Yet for that, this Book will doubtleſs light into the hands of many variouſly qualified

qualified, and ſome not ſo well ſeaſon'd with diſcretion as other ſome. I ſhall for that reaſon, pleaſure you with brief directions for every Hand in particular. And firſt

Inſtructions for the true writing of the beſt new-compoſed curſary Hands.

THeſe Hands may be called Secretary, becauſe Secretaries much uſe them; but they might as well have their denomination from whence they have their derivation (*i. e.*) from *Italian*, that being their Original. Yet they are become ſo abſolute, like undutiful Children as to look with contempt on their Parents, however they bear their image or repreſentation in Figure, and indeed the grand wheel on which theſe Hands move, is the *Elipſis*, or *Oval*; a Geometrical Figure, repreſenting the form of an Egg. From which all *Italian* Letters, both great and ſmall, receive their Life and Laws.

1. Provide a Quarto Book of Dutch-paper, ſuch as is white and ſmooth; by wetting the corner of a Leaf with your Tongues-end, you may try whether it will bear Ink or not, if it bears, then rule it with ſingle or double-lines, as you are before directed, you may pounce the paper with Gum-Sandrick through a cloth, (which is to be had where theſe Books are ſold) which will not only prevent ſinking, but it will alſo cauſe the Pen to run ſo ſmooth, if the Ink be free, as to produce Strokes to your admiration. Which done, lay a waſt paper under your hand, to keep the leaf clean whereon you write, and to try your Pen on. Then lay an Alphabet before you of the Hand you intend to write, and imitate the little (*a*) beginning at the left-end of the uppermoſtline. Firſt make an (*o*) and on the right-ſide thereof, before you take off the Pen, drawn down a ſtroke like a ſmall (*i*) and ſo with care and patience, write as many Letters of that ſort, as will fill half the page or leif; permitting them to ſtand twice that diſtance one from another, as one of them is in

breadth; writing them ſo exactly one under another, as that you may ſee them ſtand in true rank and file, which way ſoever you view them, evermore ſo diligently minding your improvement with a regard to the worth of precious time, as that every Letter and Line, may be better then other. That half-ſide being filled with that Letter. Lay your Ruler even under the laſt Line, and with a Pen, not too full of Ink, Rule a black-line. Juſt under which, begin the next half-ſide. Firſt make the little (a) next to that, at the ſame diſtance, as you obſerved before, make the (β) always obſerving to begin and end lightly, in the making of all Letters, but ſuch as terminate in a flat fulneſs, as do the Secretary r, f, p, q, and t. Then when the whole ſide is filled, one half with (a) and the other with (a and β) in the ſame manner Rule the next ſide and pounce it, which being done, fill one half thereof with (a, β, and r,) and the other half with (a, β, r, and δ,) ſtill continuing the ſame diſtance of Lines and Letters, with the ſame order of even placing the Letters, and the like care as before. According to this Verſe

The Writers mind muſt be intent, his Eye
To the Pens motion muſt it ſelf Apply.

Having thus finiſhed this ſecond ſide, proceed in like manner to a third, whoſe firſt Line, and firſt half-ſide, muſt be filled with (a, β, r, δ and ε,) the next with (a, β, r, δ, ε and ſ,) which order and deſign ſedulouſly proſecute with all the Powers of ingenuity and induſtry, till you arrive at *Omega*, or the laſt letter in the Alphabet; ſetting at the leaſt, half a day apart, for every half-ſide. And when you have ended with the ſmall Letters, begin with the great ones. With due obſervance of thoſe foregoing directions, which I my ſelf have not onely experimented, but ſucceſsfully experienced, to the good of many who have applied themſelves to me. When the true ſhapes of all the Letters are ſo imprinted in your mind, as that you can truly make them without looking on the

Copy,

Copy, giving every one its proper full and ſmall, by a dexterous application of the flat or edge of the Pens-nib; then you may confidently advance to the imitation of a joyned Copy, being the ſame Hand whereof you before made the Letters. For which, Rule and Pounce your Paper, and if the Capital letter wherewith it begins, be too large for you to encounter, begin it with one of thoſe leſſer Capitals, which before you imitated, they being all one in ſignification, though not in eſtimation. At the firſt writing of joyning, the greateſt difficulty is to keep true diſtances between the letters in words, and between the words, which in your imitation is beſt done by ſerious obſervation. You may at the firſt, inform your ſelf by your Compaſſes, how much you have erred in the too wide or too cloſe placing of your letters and words, which may be ſome direction, till by practice you have acquired judgment, and till by cuſtome your Hand and Eye, are become ſo well acquainted with true diſtances, as that the one will not lead the other into falſe. There are Rules of keeping ſuch a diſtance betwixt one letter and another, as that of the minums or ſtrokes of the (*m*) one from another: and to leave the diſtance of a ſmall o his breadth betwixt word and word; which are fit to be obſerved, till one is become ſo judicious, as to aſſign ſuch diſtances to letters and words, as may be more graceful. Some Hands there are, which by large diſtances, are rendred more pleaſing to the Eye. Contrarily there are others, that owe moſt of their beauty to a near conjunction. There are alſo ſome Capitals in all Hands, which written in a line, appear moſt gallantly in a more then ordinary allowance of room. Others there are, which ſeems beſt, when moſt confin'd. To give you an account how, when and where, theſe trials of skill will happen, is beyond my ability, they being accidental, though through Providence I am arrived to that maturity of knowledge, as to inform my ſelf tollerably well, when the like occaſions occur.

To all Hands, these Instructions do extend;
And all Practitioners will much befriend.
Yet we, by Rules, more near to THIS *ascend.*

1. Therefore consider in the writing of these misselaneous or mixt hands, what quantity of letters you borrow from the *Italian*, and to that number, and those letters, you must punctually keep in the present piece you write.
2. However the Hand be mixed, all the letters in a piece, must tend and bend one and the same way, the contrary rendring writing ridiculous to a judicious Eye.
3. Such choice of Secretary letters must be made, as may best comply and joyn with those of *Italian*, to which end, we must abandon those, whose shapes render them incapable of uniting, as the ß, d, ꝟ, ꝯ, ꝑ, ꝗ, ꝛ, ꝝ, and ꝫ.
4. If you continue the minums sharp, you must not derive all the Capitals immediately from *Italian*, though from thence you may take these small letters, viz. *b*, *c*, *d*, *e*, *f*, *g*, *h*, *k*, *p*, *q*, *s*, *w*, *x*, and *y*.
5. If the (*m*) be round, all letters must be so far of the same fashion as their shapes will permit. The Capitals for such a Hand, (if the minums are short and stand wide) must be had partly from the Roman: but if they be longer and stand close, they must be taken more from Italian; yet still some may be Secretary.
6. That hand must not lie much slanting, whereof the letters are full bodied, for that all oblike lines, or strokes descending from the right hand to the left, must be small, on which Rule Italian hand depends.
7. All compound running hands, consisting of many Italian letters, must bear an oval form.
8. Take this for a general Rule.

Mixt,

Mixt, more or leſs, Theſe are alike in All,
The Compaſs, Depth and Diſtance, Full and Small.

Theſe Rules I the rather deliver, becauſe I would that Practitioners, after a conſiderable time imployed in imitation, might of themſelves be able rationally to inlarge their practice; ſo as to ſupply by their own judicious pains, the deficiencies of that Copy whoſe hand they fancy. For it cannot be reaſonably expected, that a ſmall Book, conſiſting of Examples variouſly Pen'd, ſhould contain all things neceſſary for the ſeveral varieties. Though Alphabets be of excellent concernment in this reſpect to Beginners, yet when a Learner hath maſter'd the Alphabet, and wrote ſo long by a joyn'd Copy of the ſame Character, as to give a lively Repreſentation thereof in its whole courſe and cariage, with ſuch curioſity of Artifice, as that from the charming ſweetneſs of a hair-ſtroke, he is able to raiſe or draw down the full body of a letter, ſo as not to offend the Eye of the moſt critical Spectator: Yet I ſay, when buſineſs, or an ingenious ambition, ſhall excite him to inlarge, and write many lines of the ſame hand with his beloved Copy, then what ſhall he do? where ſhall he meet with Rules for the various conjunctions of letters? how ſhall he depend upon his own judgement before he hath it? or ſhould we hold with ſome quaint Wits of our Age, that man hath the ſeeds of all Sciences in him; yet like thoſe in Gardens, they riſe not to maturity, without much Weeding, Pruning and Watering, that is, he muſt be indoctrinated, and Principles muſt be diſtill'd into him, and if ſo, the foregoing inſtructions may be admirably uſeful.

Rules for Set Secretary.

THe ſmall letters of this hand for the moſt part depend on the perpendicular or down-rig
line, whoſe property is always to be full, but when it is drawn by the ſides of down-right Capital
as the ff, and f, or as it is ſometimes ſtruck twice equidiſtant; thorough round-bodied Capitals f
ornament, when it is eſſentially neceſſary it is never ſmall. Therefore before the learner attempts t
imitate the letters of this Hand, I adviſe him to rule his book with double lines, at ſuch a diſtanc
as the ſmall ſhort bodied letters are in depth. Then having a Pen a degree harder then ordinary
with a reaſonable long Slit, and a Nib proportioned to the breadth of the minums; ſet the le
corner thereof gently to the lower line, and therewith draw a hair ſtroke, in imitation of the uni
ting in this Hand, that may aſcend from the lower to the upper line. Make ſo many of thes
ſtrokes with an eaſy pulſe, till you can proceed no further, as to their ſmooth, even pleaſantnes
with their true poſition or right lying. Then practiſe the perpendicular, making ſo many lines o
the ſmall (i) till you can at one ſmooth draft, with a flat application of the Pens-nib, near if not al
together parallel that in the Copy you write by.

Next make the (r) (m) (n) and (u) which will exerciſe, both the uniting and down-right lines
when you can readily and perfectly command them. Set to the making of a ſtem or the (f) whoſe
head being drawn lightly with the Pens-edge, turn it by degrees to a flat, draw it abſolutely down
and cut the bottome or foot with the edge, and a light motion from the left to the right aſcending.
When you are maſter of that, you will with facility make the (b) (h) (p) and (f) The (f) and
long (ſ) I call double bodied letters, they requiring not onely the breadth of the Pens-nib, but
an extraordinary preſſure beſides, whereby their bodies may be ſwell'd out to a proportion agree-

able

ble to their length, whose heads and these of the (b) (g) (f) and (l) we sometimes wheel off with the Pens left corner towards the right hand, beginning where they and the body unite, and after draw down the body, yet so as that conjunction may not cause an unhandsome disjunction. The compass letters by this time expect a visit, which you must not give them, till you have consulted with that Copy at the beginning of the Book which shews their correspondency, and how they may be helpful one to the making of another, which being known, the best Examples are the onely Rules. The Capitals are performed with ease, after the Learner at two parts can express a circle with the true effects of the Pen, which is done by turning the Pen towards the left hand, as for a (C) and closing that with a contary stroke, as the (O) is made.

A General Rule.

For every several fulness, the Pen is taken off, being swell'd out, and drawn in by such degrees, as the nature of every stroke requires.

For Text Hand.

THe considerations as to the Pen, with the dependancy of letters on the perpendicular and circle, are so much the same with Set Secretary, as that I shall not need to repeat them. Besides, the general Rule last given, will be found of admirable concernment in all letters of this hand. The Pen being remov'd at every Quadrature, and the left corner of its Nib, applyed in the drawing of all hair strokes. As for the flourishing of Text Capitals, it is a Mystery which requires a History. It were infinitely better they were plain, then to be so lamentably accoutred, as they are by too many Pharisaical Scribes. It's impossible I should croud into this Compendium, the vast Treasure I have by me and in me; in order hereunto, having been excited from the beginning, by the Ardour of a flaming Genious, to the Practice of such Curiosities. Yet so long as HE who gave me life and knowledge, shall be pleas'd to continue them; such as address themselves

themselves to me for information, shall (for a reasonable satisfaction) be inriched with the quintessence of my acquirements.

Rules for Roman Hand.

THis Hand derives its form, as I may term it, from a Circular-oval, all the compass letters therein whether great or small, being fashioned, and regulated thereby. It is a Hand of admirable uniformity, the compass letters bearing all alike dimension, and those with Stems being all equal in height It doth not cringe and lie so slanting as *Italian*, and therefore though it be less fine, it is more substantially bodied. An easy Pulse, and pliant Pen, do best perform this Hand. For which take these rithmetical Rules

All of one height are b, d, f, h, k, l, *and long* ſ.
One compaſs ild are b, d, g, *and* o, p, q, *expreſs;*
Like tails have f, p, g, ſ, y, *like diſtance* m, n, u.
Like ſtanding Corn wav'd by the wind, words are when written true.
From word to word we commonly aſſign a ſmall (o)*'s ſpace.*
The letters in all words we do with minums diſtance grace.

I shall refer you to the examples in the Book, not giving more Rules for a Hand so much out of date, as I shall take leave to tell you in a solacious digression. Thus——

This was not long since spruce *Amoroſa's* Hand, wherein she drew the portrait of her soul. And also grave *Matrona's* onely character, in this she wrote her pious meditations, with all her choice Receipts to help infeebled nature. But Females are now so Tympani'd with Pride, they spurn at all that is not the Mode. Old *Ruſticus* his Daughter Mrs. *Trull*, scorns to learn any but *Italian* Hand.

Rules

Rules for Italian Hand.

The Charming Oval gives this Hand a grace,
Whose winning sweetness may of all take place.

THE Oval makes this Hand, therefore first make an Oval, not onely one, but make so many of the same size with the Hand you intend to write, till you have acquired such an unerring carriage of your hand, as to produce them with as much ease and perfection, as you can imagine them. To that end, rule a side of paper with double Lines, distant the depth of your letters, in which make nothing but Ovals, all lying the same way with your desired hand. If your hand be unruly, and will not obey your mind, you may at the first make oblique strokes in those Lines, with your Ruler and a Black-lead Pen, placing them just after the manner, as the small (*i*) stands in the Copy, but they must have neither head nor foot like the (*i*) Then from those strokes, standing at a convenient distance, you may on their left side, first draw one half of the Oval, and then either carry the Pen up from the bottome, or draw it down from the top, and so make the right-side, being very mindful to keep the same distance in both the sides from the straight stroke, which will then seem to be drawn exactly through the middle of the Oval. This do till you have acquired a habit enabling you to make them according to what I said before. Which done, proceed to a practical use of your attainments, by endeavouring to make the winding top of stems, consisting of Ovals, running one into another, to do which, begin where the stem seems to incline to a flat; thus having gone a little way with the left corner of the Pens Nib, twine it to a flat to express the shadow at the top, and wheel it off, ever bearing lighter and lighter, as the strokes winds into the fashion of smaller Ovals When you are perfect in these, draw down from them a stem like that of the (*k*) yet

turn it not up at the bottome, as the manner of that letter is, but draw it downwards toward the left hand into a tail, like that of (*f*) this do till your drafts curiously resemble that letter; which when you have done, you have bravely conquered all letters with stems and tails, and have past the greatest difficulties in this Hand. Next proceed to the short bodied letters, imitate those first, whose likeness renders them helpful one to the making of another, as the (*c, e, o, a, g, q,*) (*i, r, n, m, u, w,*) after which make the rest of the Alphabet. After you have attained to the exact performance of small letters, there will be no difficulty in capitals, observing the same rules, there being no letter, or part of a letter, however large or small, but hath its sole dependance on the form of an Oval. But for your further satisfaction, take these particular Rules.

Choose, when to write Italian you begin,
A long Nib'd Pen; small; rounded not, within.
Bear your hand light, and outward, use free Inke,
Buy smooth white Paper, pounce it lest it sink.
Lightly, your Pen into smooth Ovals roul,
With Arches equidistant from the Pole.
All duplicating strokes make full, *and all*
Strokes that descend from right to left make small.
Write not too swift at first, observe each Grace
In every letter, their's will be the race
In this rare Art, who can be wisely slow.
It is in vain to act, *till first you* know.

On the Excellencies of that Exquisite Art of *ARITHMETICK*.

IN Number, Weight, and Measure, God did frame,
Each Thing beneath the Stars, that bears a Name.
The Deity, in Numbers take delight,
Oft used, when the Spirit doth indite.
Should Numbers be into oblivion cast,
Then would heroick Arts soon breath their last.
If all-informing Numbers should expire,
The World into its Chaos would retire.
Yet, were Earths Globe all into Atomes shred,
And then, with heav'ns bright flames, all numbered.
Their Total would seem Ciphers, to express
Infinity; this unites numberless.
The sev'n illustrious Sciences we find
To be the product of the active mind.
Implanted there by heav'n, and by the Pen,
Delineated to the view of Men.
These Arts accommodate both Age and Youth;
All Hand-maides to heav'ns Daughter sacred Truth.
A perfect harmony there is of all
The Arts discussive, and the practical.
He that contemplates Mathematick Arts,
And would demonstrate all their practick parts,
Must do it by ARITHMETICK: from Lines
And Numbers light, the demonstration shines.
Who well this Art of Computation gains,
Will scarce compute the Arts which he attains.
All twine their Beams with This, THIS their best friend,
Doth to all Sciences assistance lend.
Th' accute Surveyor, who can give you all
The true dimensions of Earths mighty Ball;
Must first survey Arithmetick, which shews
The just accompt of every tract he goes.
By this he soon each distance doth declare,
Of Plats and Structures, Circular or Square.
In all rare works which Dialists have done,
They find Arithmetick their second Sun.
The Compass with Arithmetick is crown'd,
By which the Navigators Course is found.
The Military Artist finds it rare:
And the Physician claimes therein a share.
He who is skill'd ith' Alphabet of Stars,
And reads in Heav'ns vast volumn Peace or Wars.
To those sublimities doth first arise
By Numbers Aid, they mount him to the Skies.
The large description of the heavenly sphere,
The placing of the Signes and Plants there;
The Zones, the Poles, and the Meridian line,
Their length and distance Numbers do assigne.

The Astrolabe Staffe Sector Compass, are
Weak helps should not this Art their use declare.
The Planets aspects Sol's diurnal race,
When Luna hides, when she unmasks her face,
Times motion from its birth, and when the tide
Both Ebbs and Flows, by numbers are discry'd.
Musicks harmonious concords, for the voice
And instrument, which make sad souls rejoyce;
With Mood, Tense, Key, Note, Minum, Brief and Long,
And all Division both for Aires and Song;
Proportion sets them in their proper places,
Preventing discord which this Art disgraces.
Orpheus, *by harmonious numbers pow'r.*
Those civiliz'd, who used to devour.
Euclid, *might set his Elements on fire,*
Did not choise numbers with his lines conspire.
Atlas *his load were a confused Mass,*
Should it without the use of numbers pass.

Arithmetick, that Starry Firmament,
Here in a moment, millions doth present.
Digits in Government, still bear a part
In every Region of this Princely Art.
Cyphers to Millions, can a Unite mount,
Yet Circles by themselves of no account.
Note, Adde, Substract, Devide and Multiply
These, simple and compounded, will unty
The hardest knots and curiosities,
That (solvable) can in this Art arise.

Figures like constellations numerous grow,
Whose products, answers to choise questions show
Their operations, planets like are made,
Sometimes direct, and sometimes retrograde.
Largest of Numbers, and least Fractions, can
N'ere be found out by all the Art of Man.

I N Number, Each Thing be

The true aloyes of Silver, and of Gold,
And Coyns true value, numbers doth unfold.
Would'st thou grow Rich by Merchandise and Trade,
Be in Accomptant-ship an Artist made,
For Companies and Exchanges, 'tis of use,
In Order, Coyns, Weights, Measures to reduce.

The ventrous Merchant, who does plough the Seas,
Scale Rocks, and fathome Mines, with Savages
Converse and Trade, and Correspondence hold,
And fraights his Ships with Silver, Gems, and Gold.
To Numbers and Book-keeping oft repair
(Whereby he regulates his vast affairs,)
Sees if he prospers, or a Bankrupt grows,
Which by computing suddainly he knows,
If he all Debts, Goods, Men, and Money take,
And Debitor, or Creditor thereby make.
Of Bodies, though irregular this Art
The Inches solid truly doth impart,
Yea, further yet, should its strange subject be
Colossus *Leg, or Arme of stone huge tree,*
It would thereof the true content declare,
In weight, and measure, be it round or square;

Or

Or something, like a ragged Rock, yet neve
The part it deals with from the whole deſever;
Yea, ſtill its wondrous Operations flow
Much higher, it the true Content will ſhow
Of hollowneſs, (which in a Pillar lies,
Or ſome great Maſs) not ſeen to mortal Eyes.
This alſo can produce you the juſt weight
Of Ships, with all their Furniture and Freight;
Or any thing ith' Water were a Maſs,
Compounded of Gold, Silver, Tin or Braſs.
This without melting down, or parting, ſhall
Exactly ſhew the quantities of all.
By this brave Archemedes *gain'd Renown,*
Deſerving a more rich and glorious Crown.
Then that he found the mixture of, for his
Diſcov'ring where dark fraud had wrought amiſs.

To his Honoured Friend that moſt Elegant Penman, Curious Engraver, and able Arithmetician, Maſter *EDWARD COCKER.*

OUr Authors high Renown ſo well is known,
Long ſince it round the Univerſe is flown.
The Pens Experience glorioufly tranſcends
In Triumph *with great* Gallantry; *nor ends*
It there, but flying *the whole world ſurveys.*
And here *the choiſeſt of its* Hands *diſplays*
Delightful flouriſhes his Copies were
Inextricable Knots, their Borders reare.
The Pens Embaſſadour, the Graver, brings
A Preſent worthy of the view of Kings.
Firſt, Champion like, his Pen the way doth lead,
Then on the ſame ground doth his Graver *tread.*
The Graver doth the Pens Renown advance,
Tracing the Liſts with his depreſſed Lance.
Let but his Graver plough the barren land,
Rich flow'rs appear in turning of a hand.
What ſaid I, flow'rs, all portraictures appear
Both in the Earthly and the Heav'nly ſphear.
Thus while each others honour they deſigne,
They ſteer one courſe, move in the ſelf ſame line.
Writing and Numbers clad in Bridal veſt,
Here ſolemnize a joyful Nuptial feaſt;
Whoſe Stately yet benevolent aſpect
With love and wonder curious Eyes affect.
Our Authors Works, beſt proved in their uſe,
The moſt accompliſh'd Maſters do produce.
Here from Arts fountain ſtreams ſo clearly flow,
Learners without a Tutor Maſters grow.

Thou while the Pens embroyderies we peruse,
Numbers choise faculties our Souls infuse.
My admiration all its banks o're flows,
To see that writing now so famous grows.
But viewing all these Arts, so high advanc'd
With Joy and wonder I am even entranc'd.
Thou who dost Arts so delectable make,
Of choisest pleasures may'st thou still partake.

Thou who in Numbers skill dost all surmount,
O may thy wealth be more then thou canst count.
Thou who the Gravers Art dost so refine,
May'st thou for Plates ne're want a golden Mine.
Thou who the Pen dost to such honour raise,
May all Pens write Encomiums in thy Praise.

HENRY PINHORNE

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